Rose World

R E S E A R C H

M. S. Viraraghavan

A ROSE PILGRIM'S PROGRESS

Quite often taking the road acts as a powerful incentive to finding the right one, which is exactly what happened when I first started rose growing as a young boy barely in his teens, in the early 1950's. On a sudden impulse I told my father that we must start growing roses. My father was a man of great energy and quite well placed as a senior civil servant to collect plants from the vast area of Madras State in South India, (now Tamil Nadu) which he oversaw as Director of Agriculture. So in an unbelievably short time a dozen giant rose plants arrived, with stems as thick as a man's arm. I now realize that they were China Roses, probably varieties like 'Slater's Crimson China', 'Old Blush', and 'Archduke Charles' - all of which grow to tremendous size in the hills of the east coast of India, from where these roses had been collected, Quite predictably, such large plants, obviously ruthlessly uprooted, and now planted near the sea, in pots not large enough to hold them, very soon perished.

The first lesson had been learnt - bare root plants, especially large ones, will not easily survive being transplanted to less than congenial climates in the plains of India. In fact the solution to this problem came very much later in the method evolved by Mr. Joshi, an engineer, not a horticulturist, of Poona in Central India, who initiated what is called the 'poly-bag method'. Simplicity itself, the method of consisted of rooting cuttings of rose stock, usually R.multiflora, in sandy soils, in 4 inch transparent poly-bags. When the roots are visible, which happens in a month's time, in most places in India, budding is done. Mr. Joshi had systemized this. Three or four persons would sit around a table, with a basket of these, rooted stock, a plentiful supply of plastic tape and scion rose cuttings for extracting bud eyes. One person would extract the bud eye and pass it on to the next who would insert the bud eye in the root stock, and pass this on to the person who would tie the plastic tape, the next person would tie a label and keep the plants in a rectangular tray designed to hold two dozen budded plants. These trays are then kept under shade cloth. Those plants where the bud eyes are green after three weeks are transplanted into bigger poly bags with richer soil, thereby encouraging the sprouting of the bud eyes. You may not believe it, but in three months time plants of saleable size are produced. Indian rose enthusiasts prefer these small plants as they are easy to transport from the nursery to their gardens and can be transplanted without disturbing the roots.

Another important influence was the sight of roses growing in a beautiful public garden called 'Sim's Park', located at 6,000 feet elevation in the benign climate of the Nilgiri Mountains (South India), which had an incredible collection of the older H.T's, especially the Pernet hybrids like the golden 'Julien Potin' , and the bicolor 'Condesa de Sastago'.

There were many others - Etoile de Holland' and 'Columbia' to name two. The dazzling light of the mountain bestows an extraordinary glow to flower colors and the image of 'Jukien Potin' in that light still lingers.

Following my father into the civil service, I landed in an obscure little town on the east coast, Narasipatnam, some 700 kms, north of Madras. In the long evening's after the day's work was done, there was ample chance to read the rose lover's special brand of romantic fiction - the rose catalogues! One of these was the catalogue of B. S. Bhatcharji & Sons. Bhatcharji was India's pioneer rose breeder and a man of strong opinions. He made it plain that rose growers should not waste their time coddling delicate varieties raised in the cooler climates of the West. He sternly declared that rose growing is for the pleasure of growing healthy plants under normal care, and stressed the need for good Indian bred roses, capable of withstanding the rigours of the tropical climate.

I hurriedly ordered several roses from him and two of these, the incredibly fragrant "Sugandha" and the apricot "Raja Ram Mohan Roy" are still with me, after more than fifty years.

One of the problems of civil service is frequent transfers from place to place, often hundreds of kilometers from each other and in this process I landed in the middle of the Deccan Plateau at a place to the north of the central Indian city of Hyderabad - Nizamabad. There the climate was much more favourable with even a semblance of winter, so a large collection of roses could be made. I had not forgotten Mr. Bhatcharji and with the confidence of youth, started to breed 'Indian Roses'. Two strategies suggested themselves.

1. Using standard modern varieties like 'Montezuma', 'Pink Parfait' and 'Mr. Lincoln' which do well in tropical warmth, and
2. Breeding with heritage roses which do well in India - 'R-Edward', the original Bourbon, 'Gruss en Teplitz', Teas like 'Etoile de Lyon' and 'Madame Falcot', as well as a host of Chinas - mostly with no names.

As you can imagine, there were quite a few problems. In India, especially in the countryside, there are very few persons who can give even elementary advice on rose growing, let alone on rose breeding. Perhaps in the long run this is an advantage, as substantial progress can be made only on a foundation based on failures.

In these early years of my rose breeding (1960) were evolved a few roses which are still quite reliable performers in the heat. Two, derived from 'Gruss en Teplitz', were a lilac H.T., 'VANAMALI' and a cerise red with lovely darker undertones, 'KANCHI'. A very pretty continuous flowering climber, 'KANYAKUMARI' came from 'MONTEZUMA'. 'Vanamali' is today doing well even in Japan.

Talking of 'India raised' roses there was a unique opportunity to see these at first hand in the garden of a big land owner, picturesquely located in the middle of a dense forest. He had gathered all the Bhacharji roses and grew them to perfection. The only 'foreign' rose allowed was 'Peace' - the climbing version.

Soon thereafter there was one more shift - from district life to the Capital of the State, Hyderabad. The contrast between the vast open spaces of the countryside and the manorial residence of a district official to the woefully inadequate accommodation available

to the urban civil servant was painful indeed. It took some years to get over this - by building a house with a large garden on the outskirts of the city.

But in the in between barren years I ran into an extraordinary rose person - a freedom fighter, who, during India's struggle for Independence (from British Colonial rulers) had spent many years as a political prisoner - Sr. Mushti Laxminarayana. After independence (1947) he had gathered his meager savings and settled down on a farm outside Hyderabad. His passion was roses and he grew them in the hundreds. 'E. G. Hill', 'Madame Charles Sauvage', 'George Dickson', Marechal Neil' 'Montezuma', 'Mr. Lincoln' , to name a few, and many of the Bhatcharji creations. A man of simple tastes, I still remember the thatched roof pergola he had next to his cottage, covered with innumerable blooms of 'Marechal Neil' - a wondrous sight. This man of strong opinion and a grand passion for roses became a good friend and soon after he realized that I was in the civil service, advised me bluntly: "You are wasting your time. People who love plants, people who love roses, should follow their natural talents'. From the beginning I had been uneasy with my profession and the latter remarks were just the incentive I needed to quit. Which, I did, a couple of years later. Meanwhile, rose breeding had become a consuming passion.

In my wanderings as a civil servant I had the good fortune to become a friend of India's leading rose grower, Dr. B. P. Pal, who was the Director General of Indian Agriculture Research Institute, and a renowned plant scientist. All his spare time was devoted to hybridizing roses, which was a surprising stroke of good fortune for the rose movement in India. Several visits to his garden in the Research Institute in Delhi and, after his retirement, to his terrace garden, were valuable learning experiences. At the Institute he had a large area for his rose seedlings as he was so meticulous that he would select just one or two out of several hundreds each year. He also laid great emphasis on landscaping with roses and a row of standards of the white 'Molly Sharman Crawford' under planted with blue pansies is still vivid in my mind's eye.

Whither goes the Rose?
Vistas in Rose Hybridisation

By M. S. Viraraghavan, Kodai Kanal

The rose is, and has been for centuries the world's favourite flower. History, and symbolism, colour and fragrance, and sheer elegance of form, - whether the classic beauty of the single bloom, or the complex perfection of the modern Hybrid Tea - all combine to give the rose its pre - eminent position. Even the thorns have romantic associations.

With all this, it would be a mistake to assume that the rose will always retain its pre - eminence, unless there is constant effort to improve and enhance the attractiveness of the rose by imaginative hybridization. The keyword is really 'imaginative' - and that is where amateur rose hybridization will have to play a dominant role - much more so than it has done in the past. The warning signs - the limitations of commercial hybridization - are already evident. One has only to leaf through the new catalogues to realize that the flood of new H. T. 's and floribundas, and other standard types pouring out from the big rose growers, are not really 'improvements' on the standards attained in the past. These improvements will not contribute to the future of the rose. In fact they are only evidence of increasing, and potentially disastrous economic pressures - to produce something 'new'

every year, so as to continue in the race. On the other hand, the future of the rose is, and, will become increasingly more dependent on amateur rose hybridization, backed up by the support of rose societies throughout the World.

Does not this last statement place an excessive emphasis on amateur rose breeding, you may well ask ? The answer may not be very clear in India, where the popularity of the rose is still at the stage of speculative growth. But the trend in other countries - even in the U. K. , which has traditionally been the home of the rose - is not so encouraging. I quote from an article "Roses and Modern Times" by Jack Harkness (American Rose Magazine, August 1982): "When I began to breed roses in 1962, it was boom time for roses in Britain. The British nursery trade was budding around 50 million roses, one for every man, woman and child in the Country. The Royal National Rose Society was coasting along towards enrolling its 100,000th member. As proof of its confidence in the future, the R. N. R. S. took possession of its own country property near St. Albans, and began to cultivate as a fine rose garden. Twenty years later, in 1982, the scene has changed. We are producing about half as many roses for sale, and the Society has retained only a third of its membership. What went wrong ?

What went wrong was that rose breeding proceeded on too conventional lines, without taking into account the rapid changes taking place in public tastes, leisure time, economic pressures, and the like. Though there was the response to these changes on the part of the commercial breeder, this was hardly adequate, as the statistics given show.

In other words, rose breeding wasn't imaginative enough, And this, as I said earlier, is where the amateur breeder comes in, as no commercial breeder can really afford to concentrate mainly on even slightly long range objectives - his emphasis will have to be on what is immediately saleable.

In fact, developments in other ornamental plants, perhaps not popular as the rose, show clearly even now, that commercial plant breeding will have to give way, sooner or later, because of sheer economic pressures, to the efforts of amateurs supported by Specialist societies. For example, in the delphinium (which is one of the most popular border plants in the U. K.) the premier English firm of Blackmore & Langdon, which had contributed greatly to delphinium development, has already stopped delphinium breeding, because costs make it no longer viable. But, the future of the delphinium is in 'safe hands' says Mr. Stephen Langdon, of Blackmore & Langdon, as the challenge of the improvement has been taken up by scores of amateurs with the backing of the Delphinium Society of U. K.

You may therefore, expect in the future a greater emphasis on non professional breeding work. While on this, we may note that the President's International Trophy awarded by the R. N. R. S. (Royal National Rose Society, U. K.) (the premier award) has gone in 1980 to RBECCA CLAIRE, an amateur raised rose. And, in general, the amateur's performance has been noteworthy in the 80's.

With this broad perspective, we could consider the situation more specifically in India. In India there has never been large scale commercial rose breeding of the type in the West, though the first steps were undoubtedly taken, as everywhere else, by the nurseryman. I am referring to the pioneering work of Sri Bhatcharji of P. Bhatcharji & Co. followed up in more recent times by Shri G. Kasturi Rangan of K. S. G. Sons, Bangalore. But the contributions of the amateurs. Inspired by Dr. B. P. Pal, as well as the efforts of the I.A.R.I. whose efforts, albeit professionals are hardly commercially motivated, have been equally, if

not more significant.

However, without belittling the work done, one has to admit that there has been so far, a bold response to the challenge of breeding better roses for India. What we really need is a separate line of breeding fir the warm tropical climate, and more crosses between standard varieties evolved in the West, which have been selected for good performance in cold climates, will not lead us very far. We have to recognize that rose breeding in the West has been quite rightly motivated towards evolving winter hardy roses which grow vigorously and flower freely in the short summers of temperate climes . Typically results are roses like TROIKA (or ROYAL DANE, H. T. POULSEN), or FREUDE (H. T. KORDES) very winter hardy, and, which make enormous growth in a short space of time. This same extra vigour results in unmanageable and ungainly plants in the forcing tropical weather where the cold tolerance of the variety is hardly relevant.

Or, to put it in another way, roses for the tropics should be summer hardy and not winter hardy, and we have to consciously reverse a historical process of selection for tolerance to cold.

This apart, rose breeding at the non professional level, should carefully avoid the well trodden paths of the Big Boys of rose breeding. There is everything to be gained by being original.

Within this framework , what are the vistas of rose hybridization in India, and, for amateur rose breeding in general ?

1. BREEDING WITH ROSA CLINOPHYLLA :

Taking the long range aspect first, the most obvious step is to start an intensive process of hybridization, involving ROSA INVOLUCRATA (Roxb. Ex lindl) - also called Rosa Clinophylla Thory., - probably the only rose species of the tropics anywhere in the World. It is a curious fact that we in India have still not been able to take up rose breeding with the species though far away in the U. K. Mr. E. F. Allen suggested that work with this species was an course of action for breeding roses with better stamina to heat. (see article on Rose Breeding, Pg. 125, R. N. R. S. Annual 1977). From the genetics angle, the main difficulty in taking up work with this species, would be the fact that it is a diploid, whereas the standards are tetraploid. However, this can be overcome by the standard procedure of back crossing the F 1 generation which would be triploid on to the tetraploid garden rose - which should result in a certain proportion of tetraploid progeny.

But the most serious and practical, difficulty is that of getting plants of this species. 18 years back, in 1965, I had obtained a few plants from the Botanical Survey of India, but they turned out to be R. Multiflora, which never flowered ! More recent efforts through the National Bureau of Plant Genetic Resources, I. A. R. I. have not produced any results. Perhaps the Indian Rose Federation should step in and arrange to have the rose species cultivated at an appropriate place so as to be available to rose hybridizers.

2. BREEDING POTENTIAL OF R. EDAWRD / TEA ROSES.

As every rose grower in India knows, Rose Edward, the pink flowered very fragrant Bourbon Rose, and the Tea roses do very well under Indian conditions. The Edward rose

is grown on a field scale for making garlands even as far as Tanjavur District of Tamil Nadu, relishing the humid tropical climate. Tea roses are common everywhere in India - for e.g. the ubiquitous Mme. FALCOT with its distinctive yellowish green foliage and flowers of apricot blush, can be seen in every old house in Bangalore. The breeding potential of either R. Edward or Tea roses has never been adequately exploited for the simple reason that they are not obvious choices for rose breeding abroad, but in India, imaginatively handled, work with these should be very rewarding, provided one always keeps in mind their inherent mildew susceptibility.

3. BREEDING FOR DISEASE RESISTENCE.

One of the chief reasons why beginners are put off growing roses is their susceptibility to mildew, black spot, and other fungus infections. Of these black spot resistance is of greater importance throughout India, but there are some obvious approaches to breeding for black spot resistance. One of the species R. Bracteata is immune to black spot. R. Clinophylla is closely related to this species and may well transmit black spot resistance. Seedlings of R. Bracteata, like the famous climber, MERMAID were once thought to be sterile, and hence have not been used for breeding in the past. But, recently, the English hybridizer, Le Grice has introduced a remarkably free flowering milk white floribunda, PEARL DRIFT, (NEW DAWN X MERMAID) which is available in India and can be used for breeding work. Other sources of black spot resistance are the tetraploid. R. Multiflora seedlings evolved in the U. S. by Peter Semanouik, as well as the Harkness floribundas series starting with SOUTHAMPTON right upto the latest release, MOUNTBATTEN. As regards mildew resistance, I may mention the climber GOLDEN SHOWERS. Many of the modern H.T's are also quite mildew resistant - for e.g. SILVER JUBILEE, PRISTINE, etc.

4. NEW COLOURS.

a) BLUE ROSE : As dealt with in my article for the 1982 Indian Rose Annual, the researches of the Japanese biochemists, Arisumi, have shown that pigment Delphinidin, which could result in the blue rose is present in the leaves of the floribunda SAMBA (Kordes - 1964) to the extent of 15%. Playing around with SAMBA should be quite interesting. That most original of thinkers on rose breeding. Wing Commander Young pointed out long ago that it was derivatives of the old Multiflora, CRIMSON RAMBLER, such as the polyantha GLORIA MUNDI that first accounted for the production of pelargonidin, from which are derived all the vermillion roses of today. Speculating further, Wing Commander Young notes that, curiously enough, the bluest of the roses produced so far, such as the Violet rambler, VEILCHAN BLEU, and the dwarf polyantha, BABY FARRAUX, are also derived from Crimson Rambler! It is quite obvious that work with Veilchan Bleu and Baby Farraux should produce very interesting results - we have to again contend with the fact that they are both diploid.

b) BROWN COLOURS :- One of England's eminent hybridisers, Le Grice, has introduced a series of striking brown coloured roses, such as the floribundas, AMBERLIGHT (Egyptian buff), TOM BROWN (Saturn red), and VESPER (Mars orange). Here the brown colours were derived by the breakdown of lilac rose pigments, as mentioned by Le Grice himself in his address to the 10th International Rose Conference (see article on breeding of blue and brown roses in 1968 R.N.R.S. Annual). To summarize Le Grice further introduction of the genes of the species R. CALIFORNICA produced more stable brown colours. Here is a golden opportunity for the enterprising amateur breeder, as the basic work has been done. Other sources of brown colour, could be the brownish orange

floribunda, MOHINI of I. A. R. I. and the parchment brown H. T. JULIA recently introduced.
c) HANDPAINTED STRAIN: Starting with PICASSO, and upto the new release, MAESTRO, Sam McGredy has introduced a series of roses in combinations of pink, red and white, which are referred to as the "Handpainted" strain, as the proportion of the three colours varies from flower to flower, Firther possibilities in this strain are most intriguing, including red and yellow combinations, orange and yellow or mauve variations - these are obvious lines of work for the imaginative hybridizer.

5. VARIATIONS IN PLANT HABIT: The possibilities under these are innumerable - I will confine myself to two which strike me the most relevant.

a. CLIMBERS FOR THE PLAINS: As Dr. Pal points out in his book 'The Rose of India,' rose gardening in the plains of India is at a disadvantage, as there are no suitable free flowering climbers. While the ramblers as a class are a complete failure in the plains, even the so called Perpetual flowering climbers like GOLDEN SHOWERS do not so freely. But, as has been suggested earlier, if someone were to start a programme of breeding based on the old Noisetta Tea climbers like LAMARQUE or CELINE FORESTIER, both of which flower freely, remarkable results could be achieved.

b. MINIFLORA ROSES: While miniature roses are increasing in popularity in India, the plants themselves are too delicate and the flowers too small to make much of a visual impact. Under the forcing warmth of the Indian plains, miniatures grow too tall and the small flowers are lost on the giant bushes. There is much potential for breeding work in the newly introduced minflora series - roses where the flowers are somewhat larger than miniatures, but not as large as floribundas. Typical examples are the new Sunblaze series of roses from the French hybridizer, Meilland.

6. MUTATION BREEDING :

Interesting results have been achieved in India by gamma ray irradiation. For example, the work done by the National Botanic Research Institute, Lucknow by Dr. M. N. Gupta and Dr. S. K. Datta. Mutation breeding by gamma ray irradiation is hardly suitable for the amateur rose hybridizer. But there are fascinating prospects in breeding work using irradiated pollen. One of the most obviously promising lines would be use to use ultra violet radiation to irradiate pollen. Ultraviolet lamps are comparatively cheap and readily available. To conclude, as is evident from this limited survey, the possibilities of rose breeding are indeed boundness, to the percipient breeder who must be a scientist and an artist - at least a bit of both. The future of the rose depends on such men.

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FIRST STEPS IN ROSE HYBRIDIZATION WITH 'ROSA CLINOPHYLLA' (ROSA INVOLUCRATA)

By M. S. Viraraghavan.

For sometime now, the prospect of breeding an entirely new strain of roses with the genes of Rose Clinophylla (R. Involucrata) has fascinated hybridizers in India. This is for the simple reason that this species, native to the plains of Bengal and adjacent areas, is probably the only rose species in the entire world that is found in the tropical regions, and as such, hopefully carries the genes for heat resistance.

Prima facie, this species should also have resistance to water logging as it is normally found near streams and marshy places. In fact, the clone which is now with me was collected by Mr. Narender Singh of Ranchi from the dense clumps of the rose growing wild with their roots partially in the stream bed of a stream in a forest near Ranchi (Chota Nagpur Plateau, Bihar).

According to the classification in the 'Chromosome Atlas of Flowering Plants' by C. D. Darlington and A. P. Wylie, Rose Clinophylla is part of sub - genus Bracteata within the sub - genus being confined to two species, Rosa Clinophylla and Rosa Bracteata. The latter also referred to as McCartney Rose, is native of Southern China and Northern Burma, and is found similar in very moist situation by the sides of streams etc.

From the material sent by Mr. Narendra Singh, attempts to propagate R. Clinophylla were made in two ways, one by cuttings and the other by budding on to stocks of Rosa Multiflora. Propagation by cuttings was not successful but budding on to R. Multiflora produced approximately 40% take. The budded plants grew away quite rapidly and now, after two years, are well over 6' tall, with an upright moderately branching habit. The plant has a close resemblance to the bramble (raspberry) as was long ago observed by Firminger in his Complete Gardening in India. A distinctive feature is the brown mottled bark, curiously similar to the mottling found on some types of snakes. Flowering on the budded plants started in spring (April in Kodaikanal) of the second year after they were planted down in the ground. The flowers are single, with five petals, white, with fairly thin substance. The most attractive feature is the bright golden yellow stamens, which when dehiscing, have a characteristic it shares with Rosa Bracteata.

In general, this rose in Kodaikanal closely conforms to the description in Dr. B. P. Pal's book, The Rose in India - 'A stout, erect or semi - climbing shrub, flowers white, borne singly or in clusters, fruits roundish, hairy and pale'. The flowering continues for a long period, with peak flowering in April and May, and scattered flowers thereafter. It may be said to be almost continuous flowering although not, unfortunately, to the same extent as R. Bracteata. Also this species is quite susceptible to both mildew and black spot, whereas R. Bracteata is not affected to the slightest degree by either of these two diseases. The foliage is light green, deeply veined with 5 - 7 leaflets, with the apex leaflet considerably elongated, oblong to oblong / lanceolate in shape, The foliage is shining above and glabrous beneath. The curious involucres (i.e. groups of bracts enveloping the young inflorescences) are another feature by which this species can easily be recognized. Again there is a close here to R. Bracrteata. Under Kodaikanal conditions the hips take a very long time to mature - nearly six months, as against the normal four months for the Hybrid Teas. Each hip contains from 5 - 10 fairly small seeds.

Rosa Clinophylla is a diploid with 14 chromosomes, unlikely modern roses which are tetraploid (28 Chromosomes). Any programme of breeding with this species has, therefore, to take into account the difference in chromosome number. Fortunately, the Tea roses which are quite fertile, under Kodaikanal conditions, are also diploid and are the obvious choice for breeding work with the species. Experience shows that when working with specie roses it is easier to use the species as the male or pollen parent and this principal was followed during the first year, 1985, when two series of crosses were attempted with R. Clinophylla as the male parent. The first group of crosses was with pink Tea rose, Mrs. B. R. Cant (?) which bears abundant self hips under Kodaikanal conditions, with a pale cream Tea rose Mme Hoste (?), and the climbing white Tea Noisette, Lamarque. The second series of crosses with R. Clinophylla as the male parent was done using some very fertile standard tetraploid roses including 'Little Darling' (FL), 'Queen Elizabeth', 'Independence' and 'Lovers Meeting'.

The results, as could probably have been anticipated were quite disappointing with no seeds at all from the large number of crosses with 'Lamarque' , and with Mme Hoste (?). A few seeds were produced with the cross with Mrs. B. R. Cant (?), which were sown in September 1985 but they have not sprouted to date - October 1986. Of the crosses with the tetraploid, the cross with 'Little Darling' produced fairly good seed set. There were also some seed set with the crosses with 'Queen Elizabeth' and 'Independence', though 'Lovers Meeting', was a complete failure. Seeds from these crosses, sown in October 1985, have not yet sprouted, and the prospect of sprouting now seems remote.

Attempts were also made to use R. Clinophylla as the seed parent with pollen from R. Bracteata, on the logic that the two are related and so the cross should be easy. Out of a large number of crosses there was a fair percentage of success and to date six seedlings have sprouted but not flowered. Looking at the seedling it would appear that at least two or three may be genuine crosses as the foliage looks nearer to R. Bracteata than to R. Clinophylla, but we can reach firm conclusions only after it starts flowering, which hopefully should be in Spring.

During 1986, with the R. Clinophylla plants having grown much bigger and stronger, the same breeding strategy more or less was adopted. With R. Clinophylla as pollen parents a large number of crosses was made with several Tea roses, including Mme Host (?), Mrs. B. R. Cant (three different clones with probably one at least being a different variety altogether), with a buff coloured Tea, Safrano (?), and with two climbing Tea roses, one a cream with pink edges 'Glorie de Dijon' (?) and the other light lemon yellow - 'Celine Forestier'; as also with the diploid polyantha Tea, 'Cecile Brunner'. For the second year running, 'Mme Hoste' refused to oblige and of the three variants of 'Mrs. B. R. Cant', good seed was set by only one - a very large number of crosses with 'Sofrano' (?) resulted in no seed whatsoever, nor were crosses with 'Cecile Brunner' successful. A few seeds came with the cross with 'Glorie de Dijon' (?) but none from 'Celine Forestier'. With tetraploid seed parents the crosses were repeated using 'Little Darling' with some success, and a fair number of seeds have been harvested to date. Naturally results will have to wait for sowing time which will be only later in the year.

Reverse crosses using R. Clinophylla as the seed parent and R. Bracteata as the pollen parent were repeated. There has been appreciable take but the hips are yet to be harvested (October 1986).

As would be evident from what has been described above, breeding work with R. Clinophylla is not going to be easy. It is quite disappointing that the Tea roses should be so

reluctant to set seed with R. Clinophylla. A success with this strategy would have made progress much easier. But perhaps one of the few seed from the 1986 Tea crosses will sprout ? With a bit of luck maybe a few seed with 'Little Darling' as the seed parent should also germinate. While I do not intend to give up perhaps the work requires a younger rose breeder (in his 20's) or a research institution.
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A SEARCH FOR WILD ROSES

By M. S. Viraraghavan.

Wild or species roses have fascination of their own, whether it is the unique beauty of the single flower, or the lovely foliage and disease resistance or fragrance, species roses are much in advance of standard garden varieties which have lost many of these qualities, in the rose breeder's search for perfection of form in the flower (What is called the typical H.T. form). However, more than anything else, the fascination with wild roses is strongest, with the rose breeder who hopes to evolve new types by bringing in the 'blood' of wild roses into his favourite strain.

Quite sometimes back, I had written an article on India's wild roses, entitled 'Aristocrats of the Rose World' (Indian Rose Annual - IV). More recently, in the last Rose Annual No. IX - a thesis was put forward that if only we could breed roses with evergreen foliage rather than the deciduous foliage of modern varieties, we could evolve much better plants for tropical climates, where evergreen foliage is indeed an asset.

Over the years many wild rose species have been collected by us in our rose garden at kodaikanal including the sub tropical R. Clinophylla (R. Involucrata) which as readers would have noticed is the one species likely to revolutionize rose breeding in India, but though our collection had reached well over double figures - numbering nearly 20, there were two noticeable gaps, both incidentally evergreen or nearly evergreen rose species and both India - R. Gigantea and R. Longicuspis.

When the Indian Rose Federation decided to hold the 1991 Rose Convention in Calcutta, the idea occurred that here was the ideal opportunity to visit the areas of the North East where these two rose species grow in the wild, and, hopefully collect propagating material, thus adding to our collection.

The two rose species mentioned above are, by some coincidence, among the most interesting which grow wild in our country. R. Gigantea truly lives upto its name, being by far the largest growing of roses - plants have been recorded 50' in height with stems thicker than a man's arm, huge flowers in shades of light yellow to white, around 6" across, and very large fruits (hips) the size of small apples, around 1 ½ " across, and, most important from the breeders point of view, lovely evergreen disease resistant foliage. This species is one of the prominent in the pedigree of the modern rose, but it has contributed its genes not directly but through many ancient hybrids evolved by the Chinese over the centuries.

On the other hand R. Longicuspis has not been used at all with great potential as it has very beautiful evergreen foliage, great vigour, as well as lovely fragrant flowers in white - if the experts are to be believed, with the fragrance of bananas. This species is one of members of the Musk Rose complex characteristic, stressed by that eminent authority,

Graham Stuart Thomas, of wafting its fragrance in the air.

R. Gigantea is described in Dr. Pal's book, The Rose in India, as being found from Burma to Sikkim, and R. Longicuspis in the Khasia and Mishmi Hills, i.e. around Shillong in Meghalaya. Before undertaking an expedition to collect these roses, clearly a little bit of research was required to identify more precisely the areas where they could be found. So a visit was made to the Rapinat Herbarium attached to the St. Joseph's College, Trichy, rightly considered to be one of the best institutions of its kind, if not the best, in South India. At the suggestions of Fr. K. M. Mathew, its Director, whose knowledge of plants is matched only by his enthusiasm, we consulted the Kew index from 1880 onwards. These refer, in summary form, to papers published each year relating to various plants. In the Kew index for 1886 to 1895 we found a reference to the original discovery of R. Gigantea by Sir. Henry Collet which was reported in the bulletin of Botanical Society, Belgium in 1888, in the Shan States of Upper Burma, but, curiously enough, though the Herbarium has a complete set, we could not find ant further references, which was disappointing. But the reading of the discovery of R. Gigantea in the Shan States in Burma triggered a train of thought, viz. that there were references to this species being found in the adjoining area of Manipur in our Country. For instance, in the 'Dictionary of Roses' by Miller Gault and Peter Synge, published in collaboration with the 'Royal Horticultural Society' and 'Royal National Rose Society', U. K. When we mentioned this, Fr. Mathew suggested that Dr. D. B. Deb, author of 'Dicotyledous Plants of Manipur Territory' (published around 1960) with whom he was in touch, would be a good source of information. Going through the book in the Herbarium we were excited to read that R. Gigantea could be found in the Ukhrul sub - division of Manipur State, the authority being none other than that great plant explorer, Kingdom Ward.

So armed with Dr. Deb's telephone number and address in Calcutta, we returned to Kodaikanal, and tried to contact him on telephone. Dr. Deb was not very communicative, which by hindsight should have been expected, as botanists are generally reluctant to reveal exact locations where plants can be found in the wild particularly wild ones. But we resolved to try him again after reaching Calcutta for the Rose Convention. There, courtesy of Dr. B. D. Sharma, Director, Botanical Survey of India (B. S. I.) we went to the Herbarium of Hooghly, when by an extraordinary coincidence, whom did we meet but Dr. Deb himself, who after retirement was still doing some work for the BSI. After a brief conversation, and, apparently satisfied with our credentials, and perhaps because of the presence of the Director of BSI with us, we got the very valuable information that R. Gigantea was indeed still to be found in Ukhrul; and more specifically (and I would not reveal this information excepting that the plants is not particularly rare) on the footpath leading to Sirohi Peak, beyond Ukhrul. Sirohi is the romantic mountain top near India's border with Burma where Kingdom Ward found one of the most beautiful of lilies - Lilium Macleanae (named after his wife which he describes as bearing flowers of exquisite beauty of white flushed pink like 'dawn in June' (dawn in England) Lilium Macleanae is now on the endangered list.

In order to be able to identify R. Gigantea we went through the Herbarium sheets in the BSI office at Hooghly where there were many specimens, including the original collection by Sir. George Watt in 1882 in Manipur at 7,000' and, somewhat ironically (when we were going so far away from Kodaikanal in search of this rose), a specimen collected in Coonoor, Nilgiris presumably a cultivated specimen - in the 1920's. We also had a look at some specimens of R. Longicuspis, the other evergreen rose which we were hoping to find on our visit to the North East.

The next few days were spent in the All India Rose Convention. Then, as there was no

simple way of reaching by road or rail, we flew to Imphal, state capital of Manipur. Ukhrul (where we were bound in search of R. Gigantea) is 100 kms from Imphal and is a hill station at about 2000 m, altitude (7,000') and not too far from the Indian border with Burma. Now a district headquarters, Ukhrul is renowned for Tanghkul Nagas - for various reasons not relevant to this account, it has not been made a part of Nagaland State, which borders it on the North. A few hours after leaving Imphal we reached Ukhrul. But the excitement started even on the outskirts of the town when we located several wild roses growing in the undergrowth on either side of the road. Some of these looked like smaller versions of the Herbarium specimens of R. Gigantea, so we collected some budwood. At Ukhrul, courtesy of the Horticulture Department, we were joined by the District Agricultural Officer, who was a Naga, and we left straightaway for Sirohi which was a further 20 km. As I mentioned earlier, Sirohi is the abode of Lilium Macleanae (called Sirohi Lily) and it was most encouraging to see that the villagers of Sirohi valued their inheritance. We had to take the permission of the Youth Association for climbing Sirohi Mountain - as effective a means of conservation as any, especially, as the youth are all Nagas. They were mainly concerned, and quite rightly, with the depletion in numbers of the Sirohi Lily, whish is treasured as part of their heritage - a degree of awareness of the value of our natural heritage markedly absent in the so called developed parts of India. Quite soon we reached the fork where the mud road to Sirohi takes off from the main road from Ukhrul. The peak itself was visible all along, standing out in majestic isolation amidst smaller mountains. We were wondering whether we would have to climb that height to find the rose - a formidable prospect indeed, for persons like us who are far from being trained mountaineers.

Even below the mountain the weather was exceedingly chilly and the frost of the previous night could still be seen on many places on the footpath. A portion of the track - about a kilometer - proved to be manageable by the jeep of the Horticulture Officer into which we all piled. But the path got narrower and narrower and soon we had to stop and begin the trudge up the mountain.

Now the real excitement began - as we started to look around for the giant rose, and, to our surprise, and delight, we came across a specimen within a few hundred yards from where we commenced our climb. Picture an enormous Tea rose, with the same elongated sparsely leaved new shoots, not 1 ½ feet high, as the tea rose grows, on high, but with thorns and leaves very much like a Tea rose. This was our first vision of Rosa Gigantea in the shape of a climbing bush by the side of the path ascending through a tree. To confirm the identification we came across several hips (rose fruits) which were turning brownish red in the frost. But clearly these would have been yellow at an earlier stage. Each of the fruits was about ½ - ¾ inches across so, not quite the giant 1 ½ inches fruit like small golden apples referred to earlier, but a fair approximation. There was even a long flowering shoot but unfortunately at a very early stage, which is what should have been expected - after all, it was peak winter there. We collected a fair quantity of bud wood and picked as many of the hips as we could find.

Thereafter, continuing our walk, we came across other rose bushes, some with excessively thorny branches and rather rough looking foliage, others with longer more slender leaves and smoother, more pliable habit of growth. We provisionally identified these two as Rosa Sericia & Rosa Longicuspis, both of which are to be found in Manipur. A little later came the real sensation of our visit - when we stumbled across an absolute giant of a rose - standing some 25 feet high with thick branches easily as thick as a man's arm. This was surely the true form of Gigantea and our opinion was soon confirmed when we were able to find on one branch several fruits considerably larger than the fruit of

earlier rose. These were definitely 1 ½ inches across and would undoubtedly have been like small golden apples. Amidst much excitement we collected a large quantity of fruits as well as bud wood.

The weather meanwhile had turned much colder and we were advised that it would be better to return than climb the mountain, so late in the evening. So reluctantly we retraced our steps.
On the return journey we were fortunate to meet Dr. Chauhan of the Botanical Survey of India, who had taken the trouble of coming all the way to Ukhrul from Shillong to help us in our search. And thus armed with a large quantity of bud wood and lots of rose seeds of different types we returned to Ukhrul. A closer examination of the material collected and a scientific comparison of the characteristic by Dr. Chauhan with the literature on Manipur roses which he had brought along with him, showed clearly that we had indeed got R. Gigantea. It would seem that even the rose cuttings we had collected before Ukhrul was also R. Gigantea. Clearly, the plant is quite widespread in the area and an expedition in the flowering season should be most rewarding.

Readers will be interested to know that the yellow flowered form of R. Gigantea was first discovered in Manipur - as distinct from the whiter forms which are apparently more common in the Shan States of Upper Burma, where the 1888 collection, - referred to earlier was made by Sir. Henry Collett. It would be a worthwhile project to select the darkest yellow and the largest flowered of the Rosa Gigantea forms in Manipur, so that hybridizers can work with the best possible material from the horticulture point of view. The other two roses which we had collected at Sirohi, seemed to tally with Rosa Serica & Rosa Longicuspis, available with Dr. Chauhan.

So by a combination of fortuitous circumstances as well as the help of our well wishers of the B.S.I and the Manipur Administration, we were able to find both R. Gigantea and R. Longicuspis in one shot. But we felt that we should continue our mission to locate R. Longicuspis from the Khasi Hills area, which apparently, is the centre of its distribution in India.

With this aim, we returned to Imphal from Ukhrul and then proceeded to Shillong. Here again to the B.S.I Office, Eastern Region, proved most useful. We saw the Herbarium sheets of R. Longicuspis and noted that the species could be found fairly near Shillong. In passing it is worth mentioning that one form of R. Longicuspis collected in Subanasari sub - division of Arunachal Pradesh (Subanasari is a river which flows from Tibet into Arunachal Pradesh) was noticeably larger, with leaves nearly twice the size of R. Longicuspis in the other herbarium sheets. Could this be R. Sinowilsonii, closely related to R. Longicuspis but reputed to have the largest leaves of any rose?

Obviously, an expedition to the region would yield dividends.

At the B.S.I., we had consultations with Dr. Singh who kindly volunteered to come with us in our search for R. Longicuspis. At his suggestion, we took the road leading to Shillong Peak, which is the highest point around Shillong at an altitude of about 1700 metres. Fortunately, Shillong Peak Forest is in a comparatively good state of preservation as it was considered a sacred forest earlier, but now protected by the establishment of an Air Force Station - the accompanying restrictions of security are an effective deterrent to deforestation.

The road to Shillong Peak is for a considerable distance the National Highway, which

leads on to Nagaland, and the traffic, especially the lorries carrying coal from the mines further on the National Highway, had raised so much dust that all the plants on either side of the road were covered with a thick layer of grime. But inspite of this we succeeded in locating a rose plant, obviously a species, on the roadside, which beneath its layers of dust was dimly recognizable as R. Longicuspis. So we collected some bud wood of this. A little later, we took a welcome diversion away from the National Highway, passed through, the campus of the Air Force Station, and came to the Shillong Peak Reserve Forest - a rather disappointing 'forest' consisting mainly of 'Pinus Khasiana' the local conifer with scattered shrub wherever there were no Pine trees. A search of several of the ravines of that area yielded no result - we thought that R. Longicuspis would probably found nearer the streams flowing through the ravines but were not able to find any plants. So a little dashed, we returned, but fortunately for us, it was decided to take a different route back to town, when suddenly our luck changed. We came across a huge plant of R. Longicuspis - a good 15 feet high with nice shining foliage and most important of all, lots of seed: so as usual, we collected bud wood as well as seed.

As often happens, once one plant is located one begins to find more. A little further on we found several specimens of Longicuspis, indeed by the water's edge in Elephant Falls, a well known picnic spot.

Thus ended our trip to the North East, where we had successfully collected both the rose species which we had sought for. Clearly a more detailed botanical exploration of the area is called for by trained botanists, for we are sure that there are other treasures of the rose world waiting to be found, especially as one approaches the botanical wonderland where India, China and Burma meet.

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ROSE BREEDING FOR THE TROPICS

By M. S. Viraraghavan

Producing better roses for India and other tropical regions is indeed a challenging task. In addition to the normal difficulties of any plant breeding programme, warm climate rose breeding carries with it the daunting implication of having to deliberately reverse the conscious process of selection for resistance to cold, or winter hardiness, which has been the basis of Western rose breeding for well over 100 years.

Broadly Speaking, two approaches are feasible:

1. Evolving a strain of heat resistant roses starting with standard modern roses e.g. "Montezuma", or heritage roses e.g. 'Gruss en Teplitz', with good performance in warm climates.
2. Breeding with tropical rose species. Rose Clinophylla (Rose Involucrata) and its near relative. Rose Bracteata.

In this paper an attempt is made, in summary form, to set out the results achieved by adoption of these two alternate strategies of rose breeding in the light of work done, and observations made by various Indian rose breeders including the work done by the author from 1966 onwards.

A disclaimer or a plea of anticipatory bail would be in order, before we begin with this article which, while striving for scientific accuracy to the extent of information is available is unashamedly from the point of view of the practical horticulturist. As such inclusion of a certain amount of material based on intuition or 'feel' has become inevitable. In fact, without this element, it is difficult to do justice to the subject of rose breeding. May I add that this is not just the author's view - that the mechanics of rose breeding are easy enough, but that the flair for the right cross is not so - but is one well supported by various well known authorities e.g. Sanday 3.

One other important factor, which has to be taken note of is the great variation in climate which exists within the tropics, and, for that matter, within India itself. One authority, Sunil Jolly, has divided India into 10 agroclimatic zones for growing roses, and, in the ultimate analysis, separate breeding lines would be required for each of these 8 zones : 4.5. While on the subject of breeding tropical roses, adopting strategy 1, viz. working with standard / heritage varieties, which begin with the work of Sri. P. Bhatcharji. Apart from being probably the first Indian rose breeder to recognize the need to create a separate line of heat resistant roses. Sri. P. Bhatcharji has the distinction of putting his theories into practical application by raising a large number of roses which were very adapted to the agroclimate he was working in. unfortunately not much information is available on the parentages of the roses raised by Sri. P. Bhatcharji ; but it would appear that several of the hardy Hybrid Perpetuals, as well as varieties like the China Polyantha rose, 'Cecile Brunner', other China/ polyantha roses, and some tea roses, were utilized ; e.g. his varieties 'Muktadara' (satin pink floribunda) and 'Toohin' (white floribunda) appear to be derived from 'Cecile Brunner', while his apricot Hybrid Tea 'Raja Ram Mohan Roy' appears to be linked with the tea roses.

A serious effort to create such a line was initiated by the author from 1966 onwards. Among the varieties so chosen for the work were the China / Polyantha rose, 'Cecile Brunner', several of the Tea roses such as 'Catherine Mermet', 'Madame Falcot' and 'Etoile De lyon', all of which are diploid. Other choices were the Bourbon rose, Rose Edward, and the Hybrid Musk, Prosperity, both of wjhich are triploid, and the Hybrid Tea (Bourbon?) 'Guss en Teplitz', which is a tetraploid. These varieties were inter crossed with a wide variety of garden roses, ranging from polyantha / miniatures, to standard large flowered Hybrid Teas / Floribundas, as also some climbers.

Table - 1 sets out the work done on some of these varieties viz. Cecile Brunner and Catherine Mermet (diploid), R. Edward (triploid), and Guss en Teplitz (tetraploid).
S. No. Seed Parent Pollen Parent No of Crosses Hips Harvested Seedlings Germinated Remarks.

1. CECILE BRUNNER (polyantha) (illustrative list)

POLYANTHAS
1-Mr. Blue Bird

2-The Fairy 213 48 5 Work done at Nizamabad (Deccan Plateau) and Madras (East Coast), only 2 seedlings from the cross (Cecile Brunner x The Fairy) found useful for further work

2. Catherine Mermet (?) (Tea)

HYBRID TEAS
1-King's Ransom
2-Tapestry
3-Independence 125 51 10 Work done at Nizamabad (Deccan Plateau). One seedling (Catherine Mermet) (?) x Samba was introduced as a red Floribunda. "FIRST OFFERING".

3. R. Edward

FLORIBUNDA
1-LILAC CHARM
2-EUROPEANA 335 40 43 Work done at Nizamabad (Deccan Plateau), Madras (East Coast) and Hyderabad (Deccan Plateau) seedlings generally very inferior, excepting for a cross (R.Edward & Golden Showers) from which 3 fragrant seedlings emerged.

4. GRUSS EN TEPLITZ

305 88 Details Misplaced Work done at Madras (East Coast) from these crosses KANCHI (dark pink Hybrid Tea), and in a later generation, VANAMALI (lilac hybrid tea) and AMRAPALI (Pink Floribunda).

As is evident from the table, work with Cecile Brunner resulted in complete failure, except for the solitary pair of seedlings with the polyantha, The Fairy. By hindsight it is quite evident that such a result should have been expected when crossing a diploid rose with mainly tetraploid garden roses. But there is yet scope to utilize Cecile Brunner, which, as many would confirm, is indeed very well adapted to different regions of India, in work with R. Clinophylla, which is dealt with later. From (Catherine Mermet (?) x Samba), came the dwarf red Floribunda, "FIRST OFFERING"

Again, work with R. Edward did not lead to any tangible results. Nor did crosses with Prosperity - results which also could have been forecast, since triploid roses are inherently difficult to work with.

Fortunately, work with Gruss en Teplitz was much more rewarding and the author's lilac Hybrid Tea, VANAMALI, the dark Pink hybrid tea, KANCHI, the pink floribunda, AMRAPALI, are all derived from this line. In the next generation from Gruss en Teplitz has appeared the red Grandiflora, ACHANTA, from a cross with KANCHI.

Other rose breeders have also achieved some results using Gruss en Teplitz: e.g. Dr. Pal's Rose Sherbet, the floribunda. Rosemary Rose, from which is derived the very popular red floribunda Europeana (de Ruiter).

Another angle to the raising of heat resistant roses is the utilization of Standard modern varieties of the type of Montezuma (well adapted to almost all the climates in India), Garden party (at its best in cool, dry regions), Maria Callas (well adapted throughout India), and others, too numerous to mention, specifically adapted for various agro climatic zones.

One of the early success using Montezuma was the author's Kanyakumari a repeat flowering climber in the salmon pink range of colour. Further work with Montezuma, Maria Callas suffered a setback on account of the shift to Kodaikanal in 1980 from Hyderabad, where these varieties do not perform well. But there is little doubt that such an approach

would be of great value and results could be achieved much more easily than when working with the heritage varieties.

As regards heritage varieties, we observe that apart from problems caused by diploid / triploid chromosome number, these varieties, in general do not posses disease resistance as such. They appear to owe their longevity, under Indian conditions, more to disease tolerance, and the ability to recover from severe infection without special care or protective spraying. Varieties such as R. Edward and Cecile Brunner, though hardy, are exceedingly susceptible to mildew and this fault is much more pronounced in further generations raised from them.

Unfortunately the same is true, by and large, of the tea roses, which combine a moderate resistance to black spot with a great susceptibility to mildew (under Hyderabad conditions) In passing, we should mention that the results with the heritage varieties appear a little more discouraging than perhaps might be the case, if it had been possible to do the work on a sustained basis in the same agro climatic zone.

Coming to strategy II, i.e. hybridization with the tropical species, R. Clinophylla (R. Involucrata), possibilities in this direction have been pointed out by E. F. Allen. But we cannot resist mentioning that the author's attempt ten years earlier in 1967 - to obtain plants of R. Clinophylla from the Botanical Survey of India, Sibpur, ended in failure, as R. Multiflora was sent from the gardens labeled as 'R. Clinophylla', and, ignorance compounded by a belief in the infallibility of the Botanical Survey of India, led to several years being wasted before the mistake was discovered.

The strategy advised by Allen was to intercross R. Clinophylla with varieties of the type of Tea / Noisette, Lamarque, which does well in many parts of the tropics. Allen observes that as is normally the case, the F2 generation between a species and a continuous flowering hybrid is likely to be once flowering, but this could be overcome in subsequent generations, raised by selfing or backcrossing to Lamarque, to yield recurrent flowering climbers with fertile diploids would yield dwarf bedding roses suitable to the tropical climates.

The final step would be to cross the resultant diploid hybrids with selected standard tetraploid garden roses, which would yield initially, triploids of low fertility, but eventually tetraploids would arise by much the same process through which they have evolved in temperate regions, among Hybrid Teas and Floribundas.

Before taking up an analysis of the results achieved with R. Clinophylla, it would be useful to briefly describe the features of this species and its distribution in India.
The species is described by Dr. Pal in his well known book, 'The Rose in India' as a stout, erect or semi climbing shrub, flowers white, borne singly or in clusters, fruits roundish, hairy and pale. Distribution throughout India, especially in the plains of Bengal. The foliage is light green, deeply veined with 5 - 7 leaflets with an apex leaflet considerably elongated, oblong lanceolate in shape. The curious involucres i.e. groups of bracts enveloping the young inflorascences are another feature by which the species can be easily recognized. According the classification adopted by Darlington, it is the only other member of the subgenus. Bracteata, of the genus Rosa, the other member being R. Bracteata, native of South China and Upper Burma. Even from the horticulturist's point of view, the close resemblance between the two species is strikingly obvious. Under Kodaikanal conditions R. Bracteata is, by far, the superior plant, possessing as it does, two very interesting, indeed, unique features :

1. Virtual immunity to mildew / black spot
2. Capacity to flower continuously.

As such work on R. Bracteata has been carried on simultaneously with that on R. Clinophylla, with the expectation that the progeny would be easily inter crossable and the superior qualities of R. Bracteata incorporated in the strain from the beginning itself. Work started in 1985 with a clone of R. Clinophylla collected in the wild near Ranchi, Bihar State. Other clones have been reported from the Farakka Barage area in West Bengal and from the Mount Abu area in Rajasthan.

In the initial years the work was carried on using R. Clinophylla and R. Bracteata as pollen parents, following recommendations of E. F. Allen, that the cross, (cultivar X species) is more likely to succeed rather than reverse. The seed parents employed included eight varieties of Tea and Noisette roses, provisionally identified as Marie Van Houtte, Jean Ducher, Mrs. B. R. Cant (3 forms), Bouquet d'or, Safrano, Lamarque, Celine Forestier, Marechal Neil ; the polyanthas, Cecile Brunner, Perle d'or, Baby Farraux, and Gloria Mundi ; as well as certain floribundas / Hybrid Teas which are exceptionally fertile under Kodaikanal conditions viz., Little Darling, Queen Elizabeth, Independence, Lover's Meeting and Julien Potin.

It can be seen that the first group are diploids as is R. Clinophylla, and the second group are all tetraploids. The results achieved are in Table II.

An analysis of Table II clearly indicates that under Kodaikanal conditions utilizing R. Clinophylla and R. Bracteata as pollen parents, is not likely to yield tangible results. The crosses of R. Clinophylla and R. Bracteata with polyanthas have been uniformly a failure. As regards crosses with Teas, only three seedlings have been raised with R. Clinophylla of which two (T5 Marie Van Houtte? X R. Clinophylla) and (T4 Mrs. B. R. Cant? X R. Clinophylla) have not yet flowered, even in the third season after germination. Seedling No.3 (T4 Mrs. B. R. Cant? X R. Clinophylla) appears more promising as it is dwarf and has flowered twice with single white flowers of the type of R. Clinophylla in the season after germination.

TABLE II - A
CROSSES WITH R. CLINOPHYLLA AS POLLEN PARENT : 1985 - 1989

S. No.	Seed Parents	No. of Crosses	Hips	Seed	Seedlings	Remarks
1	T1 (Madame Hoste?)	Tea 5	----	----	--------	Nil
2	T2 (Boquet d'or?)	Tea 9	----	----	--------	Nil
3	T3 (Safrano?)	Tea 14	13	6	--------	Nil
4	T4 (Mrs. B. R. Cant?)	Tea 23	17	27	2	Of the two one has flowered (see text)
5	T5 (Marie Van Houtte?)	Tea 16	4	13	1	
6	T6 (Jean Ducher?)	Tea 8	1	5	--------	
7	T7 (Celine Forestier?)	Tea 6	----	----	--------	
8	Lamarque	Noisette 26	20	----	--------	
9	Marechal Neil	Noisette 2	----	----	--------	
10	Cecile Brunner	Polyantha 28	11	----	--------	
11	Perle d'or	Polyantha 30	10	----	--------	
12	Gloria Mundi	Polyantha 7	7	1	--------	Too early, Germination may occur
13	Echo	Polyantha 4	----	----	--------	

14 Gold Topas Floribunda 2 ---- ---- --------
15 Little Darling Floribunda 10 6 20 --------
16 Independence Hybrid Tea 7 5 8 --------
17 Queen Elizabeth H.Tea 4 4 5 --------

Note: ? Identification Provisional

TABLE II - B

CROSSES WITH R. BRACTEATA AS POLLEN PARENT: 1985 - 1989

S. No. Seed Parents No. of Crosses Hips Seed Seedlings Remarks
1 T1 (Madame Hoste?) Tea 1 ---- ---- -------- Nil
2 T2 (Boquet d'or?) Tea 4 ---- ---- -------- Nil
3 T3 (Safrano?) Tea 8 ---- ---- -------- Nil
4 T4 (Mrs. B. R. Cant?) Tea 26 17 47 6 Only 1 survived, this is a dwarf single
5 T5 (Marie Van Houtte?) Tea 6 3 13 --------- Nil
6 T6 (Jean Ducher?) Tea 1 ---- ---- -------- Nil
7 T7 (Celine Forestier?) Tea 4 7 ---- -------- Nil
8 Marechal Neil Noisette 1 ---- ---- -------- Nil
9 Lamarque Noisette 15 ---- ---- ------- Nil
10 Lady Hillingdon Tea 3 3 ---- ------- Nil
11 Cecile Brunner Polyantha 2 ---- ---- -------- Nil
12 Laurette Messimy China 4 ---- ---- ---------- Nil
13 Rise 'n' Shine Miniature 8 ---- ---- ---------- Nil
14 Over the Rainbow Miniature 5 2 5 Nil
15 Mini Cocktail Miniature 16 11 1 Nil
16 Little Darling Floribunda 27 23 50 1 Single cream coloured flower of Floribunda Type
17 Baby Farraux Polyantha 32 9 5 Nil
18 International Herald Tribune Hybrid Tea 3 ---- ---- ---------- Nil
19 R. Clinophylla 76 70 200 45 Nil

TABLE III

CROSSES WITH (R. CLINOPHYLLA X R. BRACTEATA) B AS POLLEN PARENT

S. No. Seed Parents No. of Crosses Hips Seed Seedlings Remarks
1 T2 (Boquet d'or?) Tea 2 ---- ---- ---------- Nil
2 T4 (Mrs. B. R. Cant?) Tea 3 ---- ---- ---------- Nil
3 T5 (Marie Van Houtte?) Tea 1 1 ---- ---------- Nil
4 T7 (Celine Forestier?) Tea 3 ---- ---- ---------- Nil
5 Bharani Polyantha 4 ---- ---- ---------- Nil
6 Little Darling Floribunda 28 23 150 4 Not yet flowered
7 Julien Potin Hybrid Tea 1 ---- ---- ---------- Nil
8 Queen Elizabeth H.Tea 2 2 10 Nil
9 Rosy Mantle Climbing H.T. 26 22 6 Still to germinate Nil
10 Lover's Meeting H.T. 1 ---- ---- ---------- Nil
11 Self of (R. Clinophylla
R. Bracteata) B 12 3 12 5 Large variation in size / rate of growth F1 Plants

As regards R. Bracteata, inter crossing with the Teas, only six germinations were recorded in cross (T1 Mrs. B. R. Cant? X R. Bracteata) of which one dwarf repeat flowering seedling has survived, which should be useful for further work. R. Clinophylla crossed into tetraploids listed above has not yielded any results. But there is one dwarf floribunda type seedling resulting from the cross (Little Darling x R. Bracteata) with cream single flowers. The only real success of the breeding programme is the raising of the seedlings from the cross (R. Clinophylla X R. Bracteata). Of these seedlings five were treated at the first true leaf stage with 0.1% aqueous solution of colchicines, with the hope of including tetraploids. Two different treatments were adopted - a) immersion of the entire seedling (excepting for the root) in 0.1% of colchicines, 3 times daily for one week.

Two seedlings identified as (R. Clinophylla X R. Bracteata) B and (Clinophylla X Bracteata) C have survived these treatments arising from the adoption methods (a) and (b) respectively.

Of these, (Clinophylla X Bracteata) B has shown exceptional growth and freedom of flowering. Judged by appearances, this is very close to R. Bracteata, the pollen parent. Several crosses have been made using this as pollen parent, as shown in Table III. The choice of tetraploid seed parents was based on the assumption that the seedling was a tetraploid. Subsequent investigations by Sambandamurthy et al Tamil Nadu Agriculture University showed however that this is a diploid with 14 chromosomes.

As is evident from Table III, the cross, tetraploid garden rose X Clinophylla X Bracteata is also one which is difficult to achieve. However, four seedlings from the cross (Little Darling X (Clinophylla X Bracteata B) have survived but are yet to flower after one growing season. Judged by appearance, they are much closer to Little Darling, the tetraploid parent, which is obviously what should be expected. Five self seedlings of (Clinophylla X Bracteata) B have also been raised, which would hopefully be more fertile than the parent. As using R. Clinophylla / R. Bracteata as pollen parents proved to be of little use, using them as seed parents was tried for the first time during 1989. The pollen parents used were the polyanthas, Perle d'Or, Cecile Brunner, as well as certain Hybrid Teas / Floribundas viz. Montezuma, Royal Gold, Fidelio, etc. A considerable quantity of seed have been harvested with the crosses of R. Clinophylla and R. Bracteata with Perle d'Or / Cecile Brunner. Germination has not yet been commenced - October - 1990. But there is yet time. Preliminary indications seem to be that using R. Clinophylla / R. Bracteata as seed parents would be more fruitful.

Before closing this account work done with R. Clinophylla / R. Bracteata we venture on the following general points, which hopefully, would be of use to other breeders. Clearly, R. Clinophylla is genetically very distant from modern roses. There is also the problem of its being diploid, whereas modern roses are generally tetraploid.

Additionally R. Clinophylla is, under Kodaikanal conditions, highly susceptible to both mildew / black spot. Unlike its almost close relative, R. Bracteata, which as mentioned earlier, is almost immune. The seedling (Clinophylla X Bracteata) B is also susceptible to mildew / black spot, though much healthier then R. Clinophylla itself.

According to the work done by Dr. A. V. Roberts, there would appear to be two different types of resistance to infection by black spot. The first type, based on cuticular resistance, and the second type, chemically based. According to these authors, from the breeders point of view, a type of resistance is needed which reappears in at least a proportion of the

progeny in undiminished strength. Such might be the case where resistance is conferred by a chemical that is controlled by a small number of genes.

While, we do hope that the resistance of R. Bracteata is due to genetically controlled chemical factors, visual impressions (which may be quite wrong) appear to indicate that the resistance is of cuticular origin.

One other problem in breeding with R. Clinophylla arises from the thin petal texture of the flowers, no doubt due, partly at least, to the diploid chromosome number. Petal texture is a factor of great importance when breeding roses for warm climates and hopefully, this problem could be overcome if tetraploid progeny with the genes of R. Clinophylla could be evolved by selective breeding.

Breeding with R. Clinophylla apart, we require a general strategy for rose breeding for the tropics. Here, the answer would be to concentrate on breeding roses which are evergreen as distinct from deciduous. We may observe that the deciduous characteristic has incidentally been encouraged by temperate climate rose breeding with an emphasis on winter hardiness. But in the tropics the situation is entirely different, and breeding evergreen rose is well within the realms of possibility. It is of interest to note that some of the evergreen rose species e.g. R. Bracteata itself, R. Laevigata, R. Sempervirens, have some of the most beautiful rose foliage imaginable. As far back as 1854, the well known English rosarian, Thomas Rivers, writing about R. Bracteata and its good qualities, said he hoped that ultimately gardeners would not be satisfied, unless all roses had evergreen foliage, brilliant and fragrant flowers, and a long season of flowering. This might seem, he said an extravagant anticipation, but perseverance in breeding would yet achieve wonders. In more modern times, authorities such as Stelvio Coggliati and Sam McGrady have emphasized the need for beautiful foliage; in other words, evergreen foliage. MsGrady has this to say - Plant qualities are going to be important in the future. We tend to look on roses at present as something to fill a bed with colour for a few months, of the year. But I think that roses - or some roses - are going to become garden plants of beauty whether the blooms are on them or not.

TABLE IV

HYBRIDS OF EVERGREEN ROSE SPECIES
S.No. Evergreen Species Hybrid Variety Parentage Remarks
1. R. Bracteata Mermaid R. Breacteata X
Yellow tea rose Rampant ever blooming climber with beautiful foliage and single cream flowers
2. R. Bracteata/ R. Laevigata Marie Leonida R. Bracteata X
R. Laevigata Climber with large full cupped, yellowish, white flowers glossy foliage
3. R. Laevigata Sinaca Anemone R. Laevigata X
Tea Rose Climber with clear pink single flowers
4. R.Laevigata/R.Wichuriana Silver Moon R. Wichuriana X
Devonienrses Large pale yellow flowers, semi double, on strong stems, foliage dark, leathery, glossy
5. R.Sempervirens Adelaide De Orleans R. Semervirens X Unknown Climber with semi double pale pink flowers
6. R.Sempervirens Bonica
(Mei de Monac) R. Sempervirens X Marthe Carron X Picasso Shrub rose pink flowers AARS 1982. Marthe Carron is pure

R. Wichuriana
7. R.Banksiae/R.Laevigata Fortuniana R. Banksiae X
R. Laevigata Double white Climber widely used as rootstock
8. R.Banksiae Purezza Tom Thumb X
R. Banksiae White Climber with profuse clusters
9. R. Clinophylla Lucinda Duplex Sport or seedling of R. Clinophylla Large double flower of white with rosy flush. Described by William Paul in 'The Rose Garden' 1848.

While such thinking may appear novel, as far as roses go, the importance of foliage has long been recognized in other garden plants e.g. rhododendrons, where evergreen foliage and the capacity of the plants to hold foliage in good condition for several years has long been prized e.g. the article 'Forget the flowers, breed for leaves' by Dr. M. J. Harvey. The romantic, indeed alluring, prospect of roses with brilliant evergreen foliage would appear to be well within the realms of practical possibility. Among the various rose species the following are evergreen or nearly so - R. Clinophylla, R. Bracteata, R. Sempervirens, R. Banksiae, R. Laevigata, R. Wichurnia. All of them, apart from beautiful evergreen foliage, share one very important characteristic - viz. of being species native to the warmer portions of the World. The link between evergreen foliage and warm climate is hopefully very close indeed, and should be a source of inspiration for future rose breeders of the tropics. Several hybrids have already been raised using various evergreen species (see Table IV which gives illustrative list) but, as could be expected, evergreen foliage was not the main object with which the crosses were made. This fascinating prospect is left to the rose breeders of the future.

Reproduced from IRF Annual - IX - 1991

A SEARCH FOR ROSA CLINOPHYLLA

By M. S. Virarahgavan

In a very interesting chapter in his classic book 'Climbing Roses Old and New". The well known English rosarian and horticulturist, Graham Stuart Thomas, has dealt, in intriguing detail, with what he calls 'the mystery of the musk rose' (Rosa Moschata). Judged by what various authorities have to say, Rosa Clinophylla (Involucrata) seems to be an even more mysterious creature. The distinctive characteristics of the species seem to vary considerably, as also the locations where it can be found, which lie scattered all over India, with no apparent logical connection to each other.

Sir George Watt, who was the Surveyor General of India in the last two decades of the previous century, and was in addition a very keen botanist, has made these observations in an unpublished diary of his explorations in Manipur during 1882. Rosa Involucrata is "common along the sandy margins of rivers which traverse the valley of Manipur proper, especially around the City. . . . . the Indian distribution of this rose is somewhat remarkable. In his Himalayan journal, Sir. J. D. Hooker points out its extraordinary occurrences in the jungles of Eastern Bengal, intermixed with palms and other tropical plants and thus living on alluvial soils. Some years ago I came upon it in great profusion within the valleys of the Rajmahal Hills" (a hill range in Bihar, located west of Asanol in West Bengal and north of Ranchi) "luxuriating under conditions so very different from those of eastern and northern Bengal that its presence there seemed unaccountable. . . . . .but the dry soil and high temperature of Rajmahal is so different from the inundated swampy plains of Bengal, I suspect that there may be two species at least commonly placed under the present name, the one, the swamp loving, the other the dry soil plant. In some respects, the Manipur form is suggestive of a third, that comes near to Rose Bracteata".

"The assemblage of wild roses of tropical (or perhaps sub-tropical) India is an important one nevertheless, and Col. D. Prain refers to R. Involucrata to three varieties (which perhaps meets the case) but these should be added R. Lyelli, an even still more mountainous form, their representative in the lower N. W. Himalayas and from thence to Rajputana and South India. Where met with, the plants, usually regarded as Involucrata, are plentiful enough, but between one locality and another a gap of many thousands of square miles may interpose over which the plant seems to posses no inclination to spread ; e.g. on passing north east from Sylhet" (now in Bangladesh) "it disappears and on the road from thence via Cachar to Manipur - a distance of over 120 miles in a direct line - it is nowhere met with until the valley of Manipur proper is reached, when, at altitudes of from 2,500 to 4,000 feet, what I have suggested as being possibly the Chinese form in the assemblage is found, not only plentiful but, I might also say, characteristic. This sudden appearance and disappearance in Eastern Bengal is that which the species everywhere manifest throughout its Indian area.

From this the reader can infer that, if there is a mystery about R. Moschata, the musk rose, there is much more complex one with R. Clinophylla.

The distinctions set out by Sir. George Watt, in the various forms of R. Clinophylla have been examined by various taxonomist, with, as could be expected, differing conclusions. One of the more recent papers on the subject is the one by Smt. Chhabi Ghora and G.

Panigrahi, entiltled "Taxanomic delineation within R. Clinophylla Complex" pub;ished, curiously enough, in the Journal of Japanese Botany, February 1985, where R. Clinophylla has been divided into two species - R. Clinophylla proper (with two additional varieties) and R. Lyelli. In other words, according to this paper, R. Clinophylla in India, exists in three forms - R. Clinophylla itself, R. Clinophylla var. parvifolia (i.e. small leaved form) and R. Clinophylla var. glabra (i.e. hairless form but with larger leaves.) R. Lyelli is held to be a different species but from a horticulturist's point of view, the main differences are slight indeed, consisting mainly of the thorns pointing downward, as against the slightly upward pointing thorns in the Clinophylla group.

But this article is mainly written from the horticulturist's point of view, and I cannot resist the conclusion that all the four forms are horticulturally not to different from each other. However, one very interesting difference between the Clinophylla forms of Lyelli is that, whereas Clinophylla generally produces solitary flowers, Lyelli flowers in corymbs. But on the whole, I am inclined to follow Sir. J. D. Hooker who observed that he could not distinguish R. Clinophylla from R. Lyelli, and following Hooker, R. Lyelli is treated as part of the R. Clinophylla group in this article.

For those who are interested, I furnish in the Appendix what Ghora and Panigrahi consider to be the salient differences between the two species, but it should be noted that, even these authors consider R. Lyelli to be a member of the same section, Bracteata, in rosa, which, according to them comprises three species - R. Bracteata, R. Clinophylla and R. Lyelli.

While there is a considerable overlap of the areas where these roses occur, broadly speaking, R. Clinophylla var. glabra seems to be the most tropical form (found mainly in Bengal, and adjoining regions at low altitudes), and R. Lyelli the most mountainous form, found in places such as Dehradun, in the foothills of the Himalayas, Mount Abu (Rajasthan), Coorg (Karnataka) and possibly, in the northern portion of the Eastern Ghats in the Visakhapatnam District of Andhra Pradesh.

Before concluding this part, I would like to stress that the above forms are horticulturally the most desirable as they have the largest leaves and flowers.

As Dr. N. C. Sen, the well known rosarian from West Bengal has observed, it will be a great advantage to rose hybridists if the various form of R. Clinophylla and R. Lyelli could be gathered at one place.

With this object in mind I have been trying to locate the various types of the species and grow them in Kodaikanal. The first member of the group which could be obtained was a plant of R. Clinophylla from near Ranchi, collected by Mr. Narender Singh of Ranchi. This is probably R. Clinophylla var. Parvifolia.

In the publication Threatened plants of India, published by the Botanical Survey of India (B.S.I.) there is a reference to R. Clinophylla getting scarce in Mount Abu. On seeing this it occurred to me that priority should be given to collecting this before it disappears. And, as luck would have it, the 1992 Rose Convention held at Baroda, which is quite near Abu. One more important reason for collecting this variant is that it represents the western most point of the area of distribution of R. Clinophylla complex in India, situated not too far from the border between Gujarat State and Pakistan.

So a trip to mount Abu was planned immediately after the Baroda Convention. Earlier we

had got in touch with some good friends in the Rajasthan administration and the forest Department, as well as the B.S.I., Western Circle (headquarters Jodhpur). Mount Abu lies at a distance of about 150 km. approximately north of Ahmedabad and is hill station at an altitude of about 4,000, with a highest point, Guru Shikar around 5,600. (incidentally, the highest point in the plains of India between the Himalayas and the Western Ghats). Starting from Ahmedabad one morning we reached Mount Abu by afternoon, and straight away set out to look for R. Clinophylla. We had the good fortune to be accompanied by some officers of the State Forest Department, as well as the enthusiastic Dr. P. J. Parmar of the B.S.I. author of the 'Flora of Rajasthan'. At first the task seemed very easy, as one of the forest guards said that wild roses were quite common all around Abu and he knew a place where it could be found, and in no time we reached this spot - about 20 km. from Abu, but we were in for a disappointment as the plants proved to be just R. Multiflora, which had apparently been planted by the Forest Dept at various places on the roadside some time back.

We slowly retraced our steps and stopped at what we thought were likely places. i.e., by the side of streams and lakes, but could not find anything even remotely resembling a rose, even after covering a fair amount of ground. So, quite dejected we returned to Forest Bungalow. The main handicap was that we had no precise information about where exactly the rose could be found, unlike our earlier expedition to Ukhrul in Manipur, in search of R. Gigantea (an account of which appeared in Rose News sometimes back). The next morning we again set forth looking for likely places, going up to the top of Guru Shikar, but not a trace of the rose. Feeling very crest fallen, we returned and, as it happened, one of the forest guards got the bright idea of stopping a villager we passed whom he knew, and asked him about the rose. Roop Singh, the villager, was at first puzzled, because, as we realized, the Hindi for 'rose', namely, 'gulab' invariably suggests to the layman, a pink flowered rose, whereas what we were looking for was the white rose. We tried to explain this, and suddenly Roop Singh perked up and said, 'Oh ! you mean Kuza' and told us he knew where it could be found. We were not certain what he meant was a rose. It was also getting fairly late in the evening, but over coming his protests, we bundled him into the jeep, and off we left for Oriya village, and there, to our huge delight, we found the rose, extensively planted as hedges around farmers fields, just above a lake. But nit a trace of flower or fruit could we find.

Back again the next morning, we had a real stroke of luck when we discovered a stem bearing a cluster of flowers. As often happens, one discovery led to another, and soon we came across a number of flowers on a plant which had climbed a tree nearby, on a hedgerow. Having collected a fair amount of cuttings we returned in triumph to the forest Bungalow, where a detailed comparison of the characteristics with the literature brought by Dr. Parmar confirmed that we had indeed got R. Clinophylla.

Curiously enough, though we spent two more days in Mount Abu we could not locate the plant in the wild and all that could be found were the roses planted in hedges in Oriya village, which were apparently in some danger of extinction as the hedges are being replaced by stone walls by the farmers. On the day before we left for Mount Abu we went again to Oriya village and took several specimens and several photographs of the area, and plants. We were lucky to locate a few smaller plants nearer the waters of the lake, but even these appeared to be suckers rather than seedlings, and we collected a few. In spite of intensive search we could not find any seed and the local farmers told us that they propagate the rose by cuttings and never by seed.

As seen at Mt. Abu, R. Clinophylla (Lyelli) is a very long lived plant. Several of the plants in

the hedges had bases 8" to 9" thick with gnarled tree like bark. Some of the specimens were 15' high and along a village path we found several in bloom with clusters of very attractive flowers, considerably larger than the Ranchi form which I had mentioned earlier. Subsequently, we found to our surprise that we had collected this rose at exactly the same point where on King had found it as far back as 1868.

It was quite clear that the rose was in grave danger of extinction. Earlier on, apparently, it could be found in several places around Mt. Abu, even next to Forest Bungalow, where we were staying (and which had a lake beside it).

So, armed with several cuttings, bud sticks and suckers of the rose, we returned to Kodaikanal. Out of nearly 100 cuttings, not one succeeded, but rooted suckers have survived, as well as two of the bud eyes, budded on R. Multiflora, by now (October - 1992) the biggest plant is 5' tall with several basal shoots, looking as could be expected, much happier in the cold climate of Kodaikanal, than the Ranchi clone. Interestingly enough, we notice subsequently, that the same rose called 'Kuza" in Abu, was referred to as "Kuzia" in the Doon Valley 'as stated by Firminger in "Gardening in India".

The Abu form of Clinophylla is now being re - introduced in the wild, with the enthusiastic co - operation of the Rajasthan Forest Department in suitable areas around Mt. Abu. As seen in Kodaikanal it is quite a beautiful plant with lovely glossy leaves and, hopefully, it will contribute to the development of good roses for India.

Reproduced from IRF Annual - XI, 1993.

ROSA GIGANTEA BLOOMS IN KODAIKANAL

By M. S. Viraraghavan

Rosa Gigantea, which the great plants man Graham Stuart Thomas refers to as "the queen, the Empress of wild roses", is by far the largest growing of all wild roses, reaching upto 50 feet. The rose was first discovered in 1882 by Sir. George Watt, Surveyor General of India, and a keen botanist, in Manipur. He charmingly describes the rose as climbing large trees and blooming in cascades from the uppermost branches, making the trees look like golden magnolias. The most interesting feature of the rose, apart from its extra - ordinary vigour, is the giant size of the flower, which is invariably cream or light yellow, (in the Manipur form), and reputed to reach 6 inches across. This species which is rudely healthy, has contributed one of the most fascinating characteristics of the modern rose - the beautiful, high centered form.

Seeds of two forms of the rose species were collected in January - 1991 at Sirohi, the first with fruit (hips) about ½ inch across and the other much longer, well over 1 inch in diameter, hence Sir. George Watt's original name R. Macrocarpa. Seeds of both forms germinated within one month of being sown in March - 1991 and about 50 seedlings, mainly of the smaller form have been planted out in various places in my garden around November - 1991. The first flowers were produced in November this year (1994) on a seedling of the smaller form - the first flowers were about 4 ½ inches across. Buds are also now visible in one of the vegetatively propagated plants of the larger form - budded on R. Multiflora.

While on the subject of propagation of this rose, none of the over 100 cuttings of both forms rooted, excepting for one of the larger type. Though transplanted with the utmost care, the rooted cutting started to wilt and turn black from the root upwards. In order to save the plant, the top portion which was still green was snipped off and made into a water cutting, i.e. immersed into a glass of water and kept in a well lit part of the green house (not in the direct sun). The water in the glass was changed once a week, and astonishingly enough, after a month callus formed, and a few roots produced in 2 months time. This water cutting is a now a bush some 8 feet high and hopefully will also flower later this year. Reproduced from IRF Annual - XIII, 1995.

IS R. CLINOPHYLLA THE LOTUS OF THE ROSE WORLD

By M. S. Viraraghavan

Those of you who have read Dr. N. C. Sen's interesting article on how he grows R. Clinophylla (R. Involucrata) in Asanol in West Bengal IIRF Annual XI - 1993), would have noted the fascinating and curious observation he makes quoting the eminent horticulturist, Shivprasad Bannerjee. Bannerjee says that he searched for this rose species which used to grow in the lowlands of Bengal like the Lotus in the past, and he finally collected a specimen in the early 1960's in Uddaranpur village of Murshidabad District of West Bengal on an island off the bank of the river Padma, one of the smaller rivers which takes off from the main River Ganges.

In the same article it is mentioned how Bannerjee found a specimen 'partially drowned in the undated island'. Material propagated from Bannerjee's original plant has been successfully cultivated by Dr. Sen in Asanol under normal garden conditions. In January 1991 I had collected the other prominent species of Eastern India, R. Gigantea, on the lower slopes of Mount Sirohi near Ukhrul, a mall town situated some 30 miles uphill from Imphal, the Capital of Manipur State. My experiences are described in the Indian Rose Federation Annual XIII, 1995 and in a series of articles in Rose News in 1991. In this background it is of great interest to reproduce below copies of some original correspondence dating to 1888 between Mr. David Prain , the Curator of the Calcutta Botanical Gardens at Sibpur and the noted botanist, Mr. Crepin, Director of the State Botanical Gardens at Brussels. These papers are reproduced courtesy of Mr. Ivan Louette of Belgium who patiently searched the archives of the Herbarium in Brussels to trace these letters.

Royal Botanical Garden
Seebpore
Near Calcutta
June 2, 1888

M. Crepin
Director du
Jardin Botanique de l' Etat
Bruxelles

Dear Sir,

I ought to apologize for not answering your very kind letter of 12th March. We have here in Calcutta long known M. Crepin bt reputation and I am very highly honoured to know you by correspondence. I am very much obliged indeed for your publication which I have received in safety.

I am not able to tell you much about R. involucrata. it was just beginning to flower when I wrote to you last and it continued to bear flowers till the first week of April. Since then it has ceased to flower and all its leaves have fallen. It now (just at the end of the hot season and we are expecting the arrival of the rains) stands bare of leaves and flowers. I shall let you know later on when the leaves appear and the other incidents of its annual cycle as they occur. I have made a collection of good flowers for you but I do not send them yet as no good fruit formed after their flowering.

You ask if R. Lyelli is still cultivated here. Dr. King, Superintendent of the Garden who has been here many years never knew it being tried prior to his incumbency. It will not grow here. This is true of the other forms you mention also. Indeed the one which grows freely here is the one which is found spontaneously growing in the Ganges and Brahmaputra delta R. Involucrata.

Mr. Duthie has far greater opportunity of getting roses of India than we but still we can get some and I have great pleasure in sending you by this post one which I hope may be interest to you. It has been sent to me by General Collett C. B. who commands one of the Brigades of the Army in Burma. He has collected it in the Shan Hills - between Burma proper and Siam - and describes it as a magnificent plant with pure white flowers 5 inches in diameter the plant sprawling over rocks and trees.

I have not attempted to do more than to reassure myself that it has not been hitherto described by an Indian author. General Collett himself in his list calls it 'my new rose' - R. Gigantea, and asks if I think it new.

I have told him that I am sending his specimens direct to you so that he may have the verdict of the greatest authority on his rose. As I learn from your papers that you have the Yunnan specimens of Franchet and Savatier at your disposal and that you have described at least one new species from that region I will not be surprised to hear that you have already got it , but if you have not I would be very much obliged if you could let his name stand, if the name is 'gigantea' is not already fore closed, or if 'gigantea' be an inadmissible name, if you call it after General Collett. He is one of our most skilful generals and what I daresay you will agree with me in thinking is of much greater moment one of our most ardent field botanists.

I shall hope to hear from you at your convenience about General Collett's Rose and shall promise myself the pleasure of writing to you again when I will send you other specimens of roses.

At present owing to the absence of Dr. King, the whole work of the gardens as well as of the herbarium fall upon me, and the work of a large garden in a climate where growth is so rapid as is this, is no easy task.

With very kind regards,
Believe Me,
Sincerely Yours.

David Prain.
Royal Botanic Garden
Shibpur
Near Calcutta

I enclose General Collett's replies to your queries regarding Rosa gigantea Collett mp. The General is, I believe, trying to bring away some living examples with him. Since I wrote to you last I have learned a very curious fact concerning Rosa involucrata. I may have told you that it is less common in Bengal, that is to say in the delta of the Ganges and Brahmaputra than it is in Sylhet which is drained by the Megna, a smaller but still considerable river of the same distributionary character. The Sylhet plains are less

populous than those of lower Bengal, the people depend largely for their food supply upon fishing the creeks and tributaries, and distributaries of the main river are not confined to their beds by means of 'bunds' (the Indian term fro embankments to keep out water). So that when the river above its cold weather level, it and more or less all of its branches overflow the adjacent plain at many points. So much so indeed that by the month of June, and then on to the month of October, the whole plain is a series of Jheels (that is, 'lakes' which dry up during the cold weather) and travelers whose only conveyance during the rains is by boat, do not keep to the main river or to its branches except in a very general way, but escape from these to the Jheels, where the water can always to be found from 3 to 5 feet deep, deep enough for the draught of the Indian country boats in this way often saving space by using as their slack the chord of a wide bend of the river, and saving time by avoiding the force of the current.

The Chief of the Post Office in the province of Oudh - R. Rose Esq. and ardent gardener himself, visited these gardens last week and told me that a year ago he was ordered to go down to Dacca in East Bengal to have charge of the Postal arrangements for this postal province (which includes Sylhet) for some time. While there, his duties took him on a journey such as I have described, and he found when sailing through these Jheels that from end to end of the province they were full of a wild rose, hitherto unknown to him, which had no leaves upon it and was in full fruit, only the fruits being above the water. This fact he had mentioned on returning to Lucknow to his friends who said it could not be a rose at all, but he had brought seeds away with him ; some of which germinated and throve quite well till the ensuing hot weather (that is April) when all died one by one within a month.

This account is that of a very observant man, and it supplies at one moment an explanation to all the difficulties I have had in considering the habits of this rose.

It shows by direct experiment why the North West of India botanists have given no account of Rosa involucrata. it could not grow with them and they therefore could not see it alive. It explains why at this season when other tropical plants with hardly an exception is in full foliage or renews its foliage in the rains - this Rose loses its leaves as I told you, at the outbreak of these (this year just a little earlier but then the rains were this year delayed) and remains bare and unsightly all through the rains. I counted the leaves on the bush I am watching on your account the other day and it did not have 5 leaves altogether, having about 30 branches. Hitherto we have not grown any of this rose in water. This we will now proceed to do so. Some of our lakes are not connected with the river. These therefore are deeper by 3 or 4 feet in the rains than in the cold weather. I shall have some plants put in at the water's edge when the lake is low this will pretty nearly correspond to its natural habitat - then it may bear fruits. Mr. Rose's account hardly affords an explanation of why it does not fruit freely here but it gives the as to an experiment which may explain this.

With kind regards,
Yours Sincerely
Davi Prain.

A perusal to the above two letters establishes clearly that R. Clinophylla was in fact growing like the lotus a hundred years back in many areas of Bengal though it is now confined to a few localities because of human pressure. But more important is the unique habit described, of a rose which grows in the water with only the fruits visible above the surface during the monsoon period.

Hybridizing with such a rose as one parent could possibly lead to roses entering the field of water gardening - an intriguing possibility first mentioned by the well known rosarian, Peter Harkness.

In order to confirm the possibility of growing R. Clinophylla in water a small scale experiment was started in Kodaikanal using not R. Clinophylla of which the plants available are too few to be risked, but some hybrid seedlings of Clinophylla crossed with the closely related species, R. Bracteata. Plants grown in polythene bags and pots were immersed in a cement tank in my house with only the top of the stems above the water level. In nearly six months all the plants have successfully adapted to this environment and one in fact has flowered. As could be expected, since the experiment has been done with species hybrids among which there is variation, some of the plants look happier than the others while it is too early to be categorical it can be said that the experiment indicates the possibility of ultimately raising rose hybrids which grow in water or at least hybrids well adapted to water logged conditions.

Reproduced from IRF Annual - 1998.

BETTER ROSES FOR THE TROPICS - BREEDING WITH R. GIGANTEA

By M. S. Viraraghavan

R. Gigantea described rapturously as the "Empress of Wild Roses" by the great rose authority, Graham Stuart Thomas, is perhaps the most attractive of India's wild roses. Sir George Watt who discovered the species in Manipur, likened the flowers to golden magnolias appearing in profusion above the tree tops in its native habitat. Apart from the beauty of the flower, and extraordinary vigour, the species is blessed with lovely large disease resistant foliage. My plants in Kodaikanal raised from seed collected in Manipur in 1991 have never suffered from either black spot or mildew.

The remarkable prospects of breeding with R. Gigantea have been highlighted by a galaxy of eminent rosarians, including Swami Vinayananda who, in a thought provoking article, "Breeding is the Word" published in the commemorative brochure brought out at the 11th All India Rose Convention at Calcutta 1991, has quoted the incomparable breeder Jack Harkness in his book "Roses" (Published in 1978). "Because most Western breeders have been concerned with breeding hardy roses" (in the Western context - it means that it can stand severe winters) "it follows that the tender R. Gigantea has been of little interest to them. That should not stop research by breeders in warm climates".

Jack's brother, Peter Harkness is even more enthusiastic. He says "as these roses embody six great virtues - health, beauty, vigour, scent, good foliage, and remontancy further direct use in breeding seems worthwhile".

On the subject of growing R. Gigantea I had written a detailed review in the Indian Rose Annual, 1998. Before going into details of what has been achieved in breeding with this species in Kodaikanal, it is appropriate to deal briefly with the work of great pioneers. It should be kept in mind here that probably only with the Chinese or Burmese forms of R. Gigantea was used in this early work, which makes breeding with our Manipur version even more replete with possibilities.

One of the earliest successful crosses was Belle Portugaise. Introduced by the breeder Cayoux in 1903, a very vigorous light pink once flowering climber but inheriting the tender

nature of the species. Other pioneer breeders include the Frenchman, Nabonnand, who introduced a series of climbing roses with R. Gigantea as one parent. Working in Southern France, his varieties include Emmaneula de Mouchy (rich carmine rose), Fiametta (Indian Yellow, single) and Senateur Amic (Cochineal carmine). Both Emmaneula de Mouchy and Senateur Amic are still available through old rose specialists, though not in India. Also in the 1920's, though work continued till early 1940, was that of an Australian, Alister Clark, whose most well known rose was 'Lorainne Lee', a pink shrub rose which is still quite popular in Australian gardens. Other interesting Clark roses include Nancy Hayward (rich pink), and Kitty Kininmonth (bright carmine rose), both climbers. None of these roses seem to have been grown in India, where probably the absence of severe winters would have resulted in very sparse flowering as these early hybrids were al once flowering types. Slightly later, the Reverend George Schoener came on to the scene, of whom a recent write up by a well known garden writer, Mr. William Grant entitled "Padre of the Roses" appeared in the journal, Pacific Horticulture. Though endowed with great energy and enthusiasm, as well as considerable knowledge of rose breeding, Fr. Schoener's work was plagued by a series of natural calamities including fire in his garden in Oregon, in the Pacific North West of U. S. A., and hurricanes in his later garden in Santa Barbara, California. Talented but unlucky, none of his numerous R. Gigantea hybrids are available today, but a breeder attempting to work with this species has much to learn from Fr. Schoener's writings. In an illuminating article on 'R. Gigantea and allied species' in the American Rose Annual, 1932, he has dealt in length with the exciting possibilities of work with this species. One interesting point that is made is that the Manipur form which is referred to as R. Macro Carpa (because of its large fruits) is considered even more promising for rose breeding. In close collaboration with Fr. Schoener's was the Boyce Thompson Institute in Yonkers, New York, especially its Director, Dr. Crocker writes, talking of the Gigantea seedlings raised by Fr. Schoener, 'I feel that you will have green house roses produced by your crossings that are so much better than any others grown now that there will be no comparison. I have been specially struck by the long conical buds that appear on many Gigantea hybrids, and the wonderful colouring and texture of the petals. Some of the foliage is wonderful. This opinion is entitled to great respect as it is based on observations of 20,000 seedlings of R. Gigantea, which were the results of 1200 combinations between the species and well known garden roses.

Three further points made by Fr. Schoener are:-
1. The seedlings are by no means as frost tender as originally expected.

2. The Chromosome number problems (R. Gigantea is a diploid while garden roses are tetraploids) are quite easily overcome.

3. The bright colours of the Modern roses are not suppressed in the progeny of R. Gigantea.

In addition to this R. Gigantea, since it is one of the grandparents of modern roses sets seeds quite easily with standard varieties and the species has that most invaluable characteristics of passing on the high centered pointed shape so beloved of rose exhibitors. In fact, the experts credit R. Gigantea with being the basis of the high centered form of H. T. Roses.

As could be expected, any rose breeder in the tropics would feel compelled to have a go at working with R. Gigantea, though the disturbing thought remains of how the results of Fr. Schoener's dedicated work could so completely disappear.

As mentioned in my earlier article, R. Gigantea flowers freely in Kodaikanal, flowering starts in November and continuing till February with a peak in mid January. Interestingly, some scattered bloom occurs at various other times of the year. The flower colour in R. Gigantea seedlings range from greenish white to pure white, cream and light yellow, the latter rivaling the well known tea rose, Lady Hillingdon, at the bud stage. Most of my work has been done with the yellowest of the seedlings.

R. Gigantea sets seeds easily, whether used as a seed parent or pollen parent, though it is prima facie better to use it as a pollen parent, as the F1 generation are all once flowering. If, as is quite possible, the cross does not take, we may have the situation of growing a seedling for many years before realizing that cross has not taken place.
In the first year work was done with R. Gigantea as pollen parent on certain standard Hybrid Teas, which do well in my garden in Hosur near Bangalore, as well as with some of the Old China / Tea Roses, as also with a few polyanthas, Pollen availability was limited that year, and of the first batch, 4 have flowered so far.

1. The cross Carmousine (an Orange - Red H.T.) x R. Gigantea produced a lovely climbing shrub, now 8 feet high at Kodaikanal, with exquisite dark red healthy foliage of the R. Gigantea type, and very artistically coloured H.T. shaped blooms of giant size, 5 inches across. The colour is best described as intensified Lady Hillingdon. The rose is pictured in the annual.
2. Another seedling of interest resulted from the cross of a pink miniature China rose closely resembling Old Blush, but much more magenta in colour, probably Ralph Moore's Mr. Bluebird. With this as seed parent has come a very healthy shrub about 6 feet high with single flowers, white with pink edges, which is also shown in the annual.
3. The first fully double, in fact super double, seedling to flower was from the cross Rev d'Or (a bronze yellow Noisette/Tea). This is a very vigorous climber, now 12 feet high with very full flowers of light yellow, strongly resembling the famous old rose Marechal Neil.
4. The fourth of the roses to flower was a white single semi climber with good form at bud stage from the cross Echo (polyantha) x the species.

In the next year work was much easier as plenty of flowers were available on R. Gigantea. Many combinations have been made and the seedlings are not yet at the flowering stage. Among these are crosses with the H.T.'s Paradise, Mango, Apricot Spice, Marmalade, Red Velvet, Arjun, Sandra, Carina etc. among the seedlings, resulting from crosses with old roses are (Old Blush x R. Gigantea), (M. Falcot x R. Gigantea), and (Mrs. B.R. Cant (a pink tea) x R. Gigantea). Several species crosses have also been made and seedlings germinated, including crosses with R. Clinophylla and the species hybrids (R. Bracteata x R. Clinophylla) and (R. Bracteata x R. Laevigata).

This year the obvious next step has been taken for back crossing the Gigantea seedlings into garden roses. As Fr. Schoener had predicted there does not appear to be a sterility problem so far.

From the above it is evident that some very interesting results could arise from this line of breeding. A great advantage in the work was the fact that though R. Gigantea flowered in my Kodaikanal garden in winter, it was possible to take and bring back, pollen from my Hosur garden which was in full bloom in December / January. Hopefully, next year I will have something spectacular to report.

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TROPICAL ROSE BREEDING & BEYOND

By M. S. Viraraghavan

There is little doubt that the rose remains the world's most popular, indeed, romantic flower, but the signs of slippage from the No. 1 position so long taken for granted, are all too evident. With the rise in the popularity of the garden centre, there are a host of other plants available for the home gardener. Again, as a commercial cut flower, the difficulties encountered in India have unfortunately had an effect on cut flower rose growing which in way provides the commercial backbone for the popularity of the rose.

The status of the rose in the home gardens is understandably affected by decreasing garden size as well as increase in shade. Rose experts, especially those of the insular kind tend to depict the rose as an exclusive aristocrat which requires its own space, and no competition from other garden plants. This attitude puts off potential rosarians, especially younger gardeners (on whom surely the future of gardening depends) from attempting roses. The reputation of the rose as a difficult plant which requires constant attention is certainly a factor which influences gardeners at a time when leisure available to tend the garden with both husband and wife working, is steadily getting abbreviated.